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PROVISIONAL SPECIFICATION.

Improvements in the Treatment of Sewage Sludge and like Materials.

I, EDWARD ALFRED PATERSON, of Thorold, Ontario, in the Dominion of Canada, Mining Engineer, do hereby declare the nature of this invention to be as follows:—

5 This invention relates to improvements in the treatment of sewage sludge and like materials.

The invention has for its object to provide improved, efficient and simple apparatus by the use of which sewage sludge or like material can be quickly and effectively dried and rendered suitable for burning in incinerators or destructors, or for other purposes.

10 According to the invention the material is passed through a heated drying chamber on an endless conveyor onto which it is fed mechanically, and the evaporated moisture and the gases driven off are continuously exhausted from the chamber, which is divided into a plurality of separate compartments, so that the hot moisture and gases are not allowed to remain in contact with the drying
15 material and have a distilling or other deteriorating effect upon same and hinder its drying.

In a suitable manner of carrying out the invention the material to be dried after having been mixed or churned in a pug mill or the like if desired, is fed into a hopper from which it is fed or drops into a chamber, and is continuously
20 forced from said chamber through a flat nozzle by means of a rotatable worm conveyor or feeding device situated in the chamber and driven from a motor through suitable gearing. Owing to the flat formation of the nozzle the material is fed and issues from the latter in a thin layer, and the material passes onto a travelling endless belt conveyor preferably made of wire gauze or other per-
25 forated material. The belt conveyor travels in a drying chamber which is heated by internal flame burners, by waste furnaces gases allowed to pass through same, or by any other suitable means. An advantage gained by using a perforated belt is that the hot gases are allowed free and direct access to the under portions of the material through said belt, thus the material is heated on
30 all sides at one time. The belt is preferably also power driven from the motor that drives the worm, but it may be independently driven from another motor if desired.

At intervals or stages throughout its length the upper portion or covering of the drying chamber, through which the material is passed, is divided above the
35 belt conveyor into a plurality of separate compartments by means of vertical baffle plates which extend downwards from the roof of said upper portion or covering to within about an inch from the material carried by said belt conveyor. An outlet opening is formed in the roof of each compartment and is preferably situated at the far end from the feed adjacent to the baffle plate at that end.
40 The outlet openings of all the compartments are connected to one or more fans or other exhausting apparatus, and for this purpose a single conduit or cover is

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Improvements in the Treatment of Sewage Sludge and like Materials.

preferably fitted over all the openings and connected to the fan or fans or the like. By these means the belt is divided off into sections and the water vapour, steam and gases evolved from the material during the drying process are continuously exhausted out of contact with the material. If desired the material can be subjected to varying temperatures in the several compartments. 5

The exhausted steam and gases may be utilized for completing the drying of the material in storage apparatus by passing them through pipes which are suitably arranged within said apparatus for thoroughly distributing the heat therein.

Dated this 22nd day of July, 1915. 10

J. S. WITHERS & SPOONER,
Chartered Patent Agents,
Staple House, 51 & 52, Chancery Lane, London,
Agents for the Applicant.

COMPLETE SPECIFICATION.

15

Improvements in the Treatment of Sewage Sludge and like Materials.

I, EDWARD ALFRED PATERSON, of Thorold, Ontario, in the Dominion of Canada, Mining Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained 20 in and by the following statement:—

This invention relates to an improved method of and apparatus for treating sewage sludge and like materials.

In apparatus for treating sewage, soap or other materials, and of a kind to which the invention refers, it has been proposed to mechanically feed the 25 material onto one or more travelling endless belt conveyors which carry it through a heated drying chamber from which the evaporated moisture and gases given off from the material are exhausted such as by fans through a plurality of spaced openings formed in the roof or crown of the chamber and leading into a common conduit. It has also been proposed to provide another form of 30 apparatus, for dehydrating animal and other substances, comprising a chamber divided into a plurality of sections by transverse partitions, in which sections the material is placed on connected trays adapted to be moved periodically through the chamber from one section to the next, and through which sections independently controlled currents of air of different temperatures and humidities 35 are drawn by a fan through openings and a common conduit or duct.

According to the present invention the upper portion or covering of the drying chamber of apparatus of the kind first referred to above is divided at intervals or stages in its length and above the belt conveyor into a plurality of 40 separate compartments by means of baffle plates, an outlet opening is formed in the roof of each compartment, and the openings are connected to one or more exhausting devices preferably through independently regulatable conduits.

A suitable manner of carrying out the invention will now be described with reference to the accompanying drawing in which:—

Fig. 1 is a partly sectional elevation of a convenient construction and arrange- 45 ment of the apparatus, and

Fig. 2 is a plan of the same with the upper portion of covering of the drying chamber and the gas conduits removed.

The material to be dried, after having been mixed or churned in a pug mill or the like if desired, is fed into a hopper *a* from which it is fed or drops into a 50

Improvements in the Treatment of Sewage Sludge and like Materials.

chamber *b* and is continuously forced from said chamber into and through a flat nozzle *c* by means of a rotatable worm conveyor or other feeding device situated in the chamber and driven from a motor through suitable gearing connected to a sprocket or other wheel *d*. Owing to the flat formation of the nozzle *c* the material is fed and issues from the latter in a thin layer, and the material passes onto a travelling endless belt conveyer *e* preferably made of wire gauze or other perforated material. The belt conveyer *e* travels in a drying chamber *f* which is heated by burners therein, by waste furnace gases allowed to pass through same, or by any other suitable means. An advantage gained by using a perforated belt is that the hot gases are allowed free and direct access to the under portions of the material through said belt, thus the material is heated on all sides at one time. The belt *e* may be power driven from the motor that drives the worm or other feeding device located in the chamber *b*, but it is preferably independently driven from another motor *g* through worm reduction or other gearing situated at *h* and *i*.

At intervals or stages throughout its length the upper portion or covering *j* of the drying chamber *f* through which the material is passed, is divided above the belt conveyer *e* into a plurality of separate compartments *k*, *l* and *m* by means of vertical baffle plates *n* which extend downwards from the roof of said upper portion or covering to within about an inch from the material carried by said belt conveyer. An outlet opening *o* is formed in the roof of each compartment and is preferably situated at the far end from the feed and adjacent to the baffle plate at that end as indicated in Fig. 1. The outlet openings *o* of all the compartments *k*, *l* and *m* are connected to one or more fans or other exhausting apparatus and for this purpose a single conduit *p* or cover is preferably fitted over all the openings and connected to the latter by conduits or pipes *q* and to the fan or fans or the like. The conduits *q* are preferably fitted with dampers *r* so that the amount of moisture drawn off from each of the compartments *k*, *l* and *m* may be regulated. By these means the belt *e* is divided off into sections and the water vapour, steam and gases evolved from the material during the drying process are continuously exhausted out of contact with the material. If desired the material can be subjected to varying temperature in the several compartments *k*, *l* and *m*. As indicated in Fig. 1 the covers or roofs of the compartments decrease in height from the feed end of the belt *e* towards the discharge end of same so that the radiation of heat from said covers or roofs downwards onto the material increases as the amount of moisture carried by the latter decreases.

The exhausted steam and gases may be utilised for completing the drying of the material in storage apparatus by passing them through pipes which are suitably arranged within said apparatus for thoroughly distributing the heat therein.

In the construction shown the belt conveyer made of wire gauze or other perforated material *e* is secured to cross rods *s* carried by two endless chains *t*, which run over sprocket wheels *u*, and the bearings *v* of the shaft *w* are carried by bell-crank weighted levers *x* pivoted at *y*. The chains *t* travel on top of and are supported by guides *z*. The mouth of the nozzle *c* may be adjustable if desired.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Apparatus of the kind referred to and for the treatment of sewage sludge and like materials, in which the drying chamber is divided at intervals or stages in its length into a plurality of separate compartments for the purposes described.

2. A process and apparatus for the treatment of sewage sludge and like materials, in which the material, after having been mixed or churned in a

Improvements in the Treatment of Sewage Sludge and like Materials.

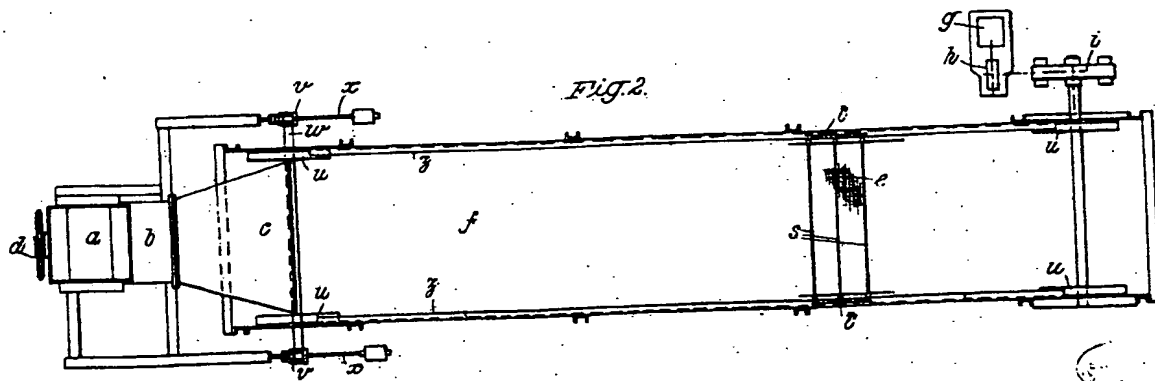
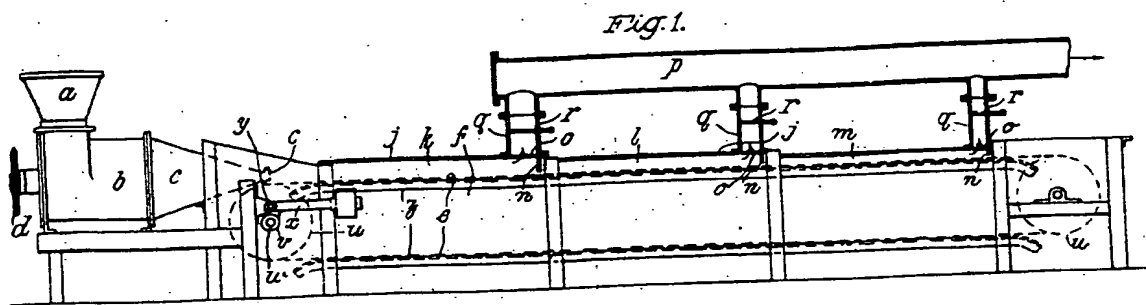
pug mill or the like if desired, is passed to be completely dried through a heated drying chamber on a travelling endless conveyer onto which it is fed mechanically, the upper portion or covering of said chamber is divided into a plurality of separate compartments above said conveyer, and the evaporated moisture and the gas driven off are continuously exhausted from said compartments so that the hot moisture and gases are not allowed to remain in contact with the material as it is drying. 5

3. Apparatus as claimed in Claim 1 or 2, in which the drying chamber is divided into the separate compartments by means of vertical baffle plates substantially as described. 10

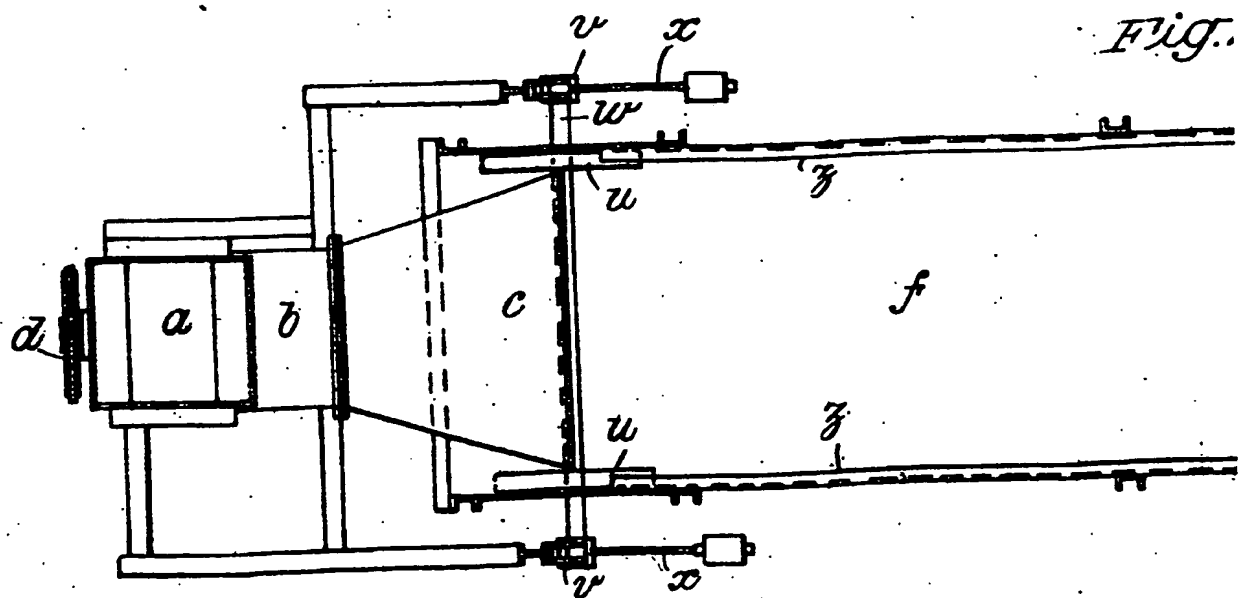
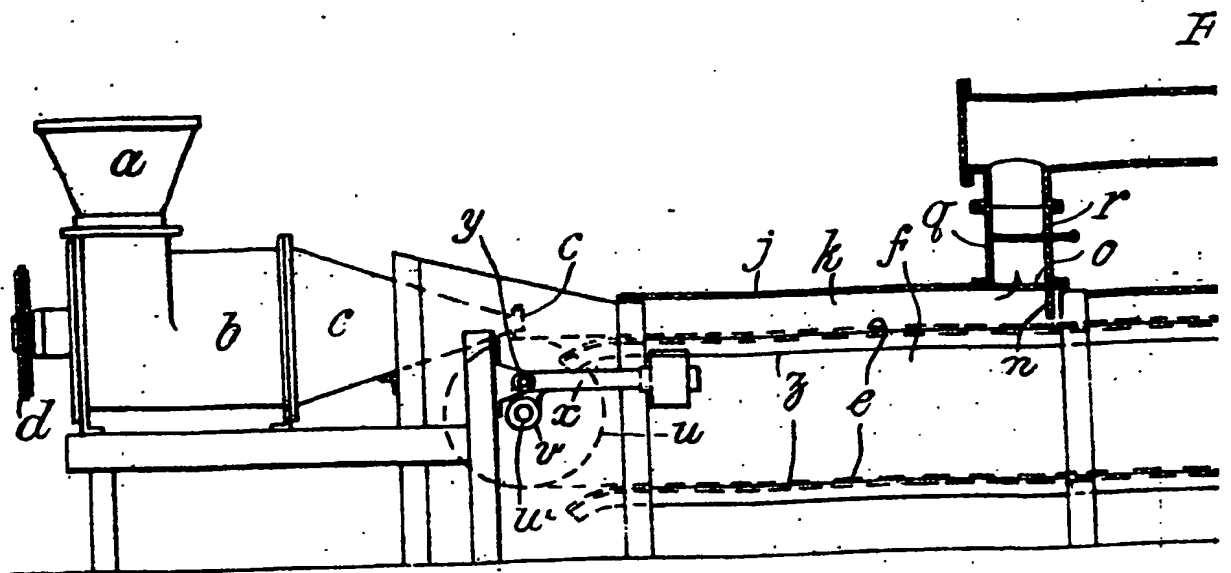
4. Apparatus as claimed in Claim 1 or 2, in which the compartments are provided with outlet openings connected to one or more fans or other exhausting devices through independently regulatable conduits.

Dated this 24th day of January, 1916.

J. S. WITHERS & SPOONER,
Chartered Patent Agents,
Staple House, 51 & 52, Chancery Lane, London,
Agents for the Applicant. 15

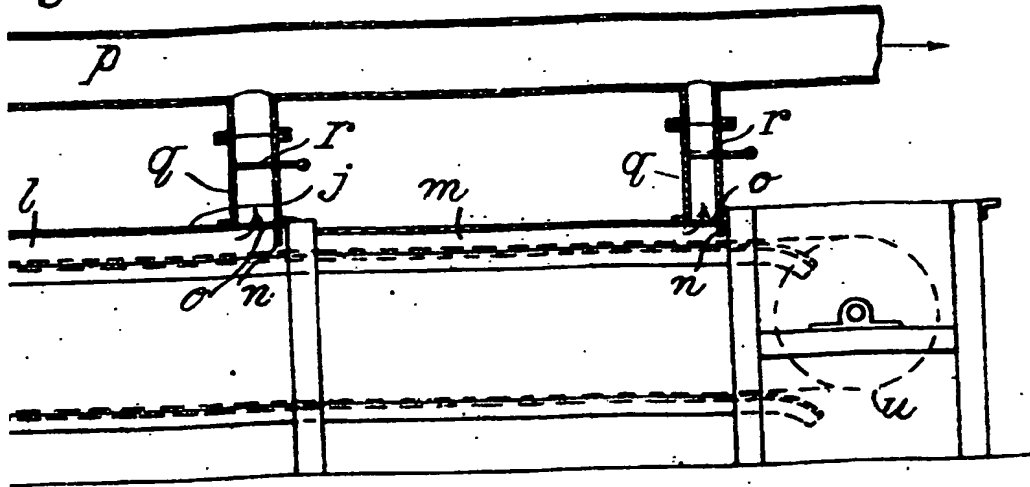


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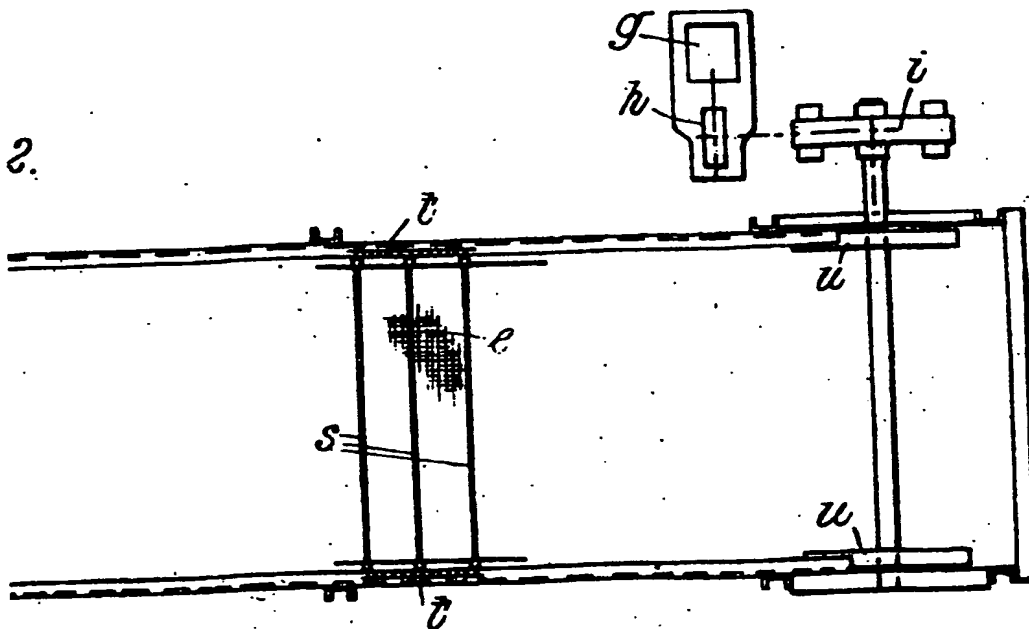


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Fig. 1.



2.



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